

WHAT IS CLAIMED IS:

1. A display device comprising:

a substrate;
an insulating film formed over the substrate;
an image signal line;
a pixel electrode; and
a thin film transistor comprising a gate electrode formed between the substrate and the insulating film, a semiconductor film formed over the insulating film, a drain electrode electrically connected to the image signal line, and a source electrode electrically connected to the pixel electrode,

wherein the gate electrode comprises an aluminum film, the aluminum film being dimensioned to cover a plan view area of a principal surface of the substrate larger than an area covered by the semiconductor film.

2. A display device comprising:

a substrate;
a scanning signal line;
an insulating film formed over the substrate;
an image signal line;
a pixel electrode; and
a thin film transistor comprising a gate electrode connected to the scanning signal line and formed between the substrate and the insulating film, a semiconductor film formed

over the insulating film, a drain electrode electrically connected to the image signal line, and a source electrode electrically connected to the pixel electrode,

wherein the gate electrode comprises an aluminum film, the aluminum film of the gate electrode being dimensioned to cover a plan view area of a principal surface of the substrate larger than an area covered by the semiconductor film of the thin film transistor, and

wherein the scanning signal line comprises an aluminum film, the scanning signal line having an upper surface with a width that is smaller than a width of a lower surface of the scanning signal line.

3. A display device comprising:

a substrate;

a scanning signal line;

an insulating film formed over the substrate;

an image signal line;

a pixel electrode; and

a thin film transistor comprising a gate electrode connected to the scanning signal line and formed between the substrate and the insulating film, a semiconductor film comprising a channel region formed over the insulating film, a drain electrode electrically connected to the image signal line, and a source electrode electrically connected to the pixel electrode,

wherein the gate electrode comprises an aluminum film, the aluminum film of the gate electrode being dimensioned to cover a plan view area of a principal surface of the substrate larger than that of the channel region of the semiconductor film, and

wherein the scanning signal line comprises an aluminum film, the scanning signal line having an upper surface with a width that is smaller than a width of a lower surface of the scanning signal line.

4. A display device comprising:

a substrate;

a scanning signal line;

an insulating film formed over the substrate;

an image signal line;

a pixel electrode; and

a thin film transistor comprising a gate electrode connected to the scanning signal line and formed between the substrate and the insulating film, a semiconductor film comprising a channel region formed over the insulating film, a drain electrode electrically connected to the image signal line, and a source electrode electrically connected to the pixel electrode,

wherein the gate electrode comprises an aluminum film, the aluminum film of the gate electrode being dimensioned to cover a plan view area of a principal surface of the substrate

larger than that of the channel region of the semiconductor film, and

wherein the scanning signal line comprises an aluminum film and a first metal film, the scanning signal line having an upper surface with a width that is smaller than a width of lower surface of the scanning signal line.

5. A display device comprising:

a substrate;

an insulating film formed over the substrate;

an image signal line;

a pixel electrode; and

a thin film transistor comprising a gate electrode formed between the substrate and the insulating film, a semiconductor film formed over the insulating film, a drain electrode electrically connected to the image signal line, and a source electrode electrically connected to the pixel electrode,

wherein the drain electrode and the source electrode comprise an aluminum film, and the drain and source electrodes are disposed such that a spacing between a lower surface of the drain electrode and a lower surface of the source electrode over the semiconductor film is smaller than a spacing between an upper surface of the drain electrode and an upper surface of the source electrode over the semiconductor film.

6. A display device comprising:

a substrate;

an insulating film formed over the substrate;

an image signal line;

a pixel electrode; and

a thin film transistor comprising a gate electrode formed between the substrate and the insulating film, a semiconductor film formed over the insulating film, a drain electrode electrically connected to the image signal line, and a source electrode electrically connected to the pixel electrode,

wherein the drain electrode and the source electrode comprise a high melting point metal film and an aluminum film formed over the high melting point metal film.

7. A liquid crystal display device according to claim 6,

wherein the high melting point metal film comprises Mo, Ti, Ta, W, or a silicide of one of them.

8. A liquid crystal display device according to claim 6,

wherein the pixel electrode contacts the high melting point metal film.

9. A liquid crystal display device according to claim 6,

wherein the pixel electrode contacts the aluminum film.

10. A display device comprising:

a substrate;

an insulating film formed over the substrate;

an image signal line;

a pixel electrode; and

a thin film transistor comprising a gate electrode formed between the substrate and the insulating film, a semiconductor film formed over the insulating film, a drain electrode electrically connected to the image signal line, and a source electrode electrically connected to the pixel electrode,

wherein the drain electrode and the source electrode comprise a high melting point metal film and an aluminum film formed over the high melting point metal film, and the high melting point metal film and the aluminum film of both the source and drain electrodes are disposed such that a spacing between a lower surface of the high melting point metal film of the drain electrode and a lower surface of the high melting point metal film of the source electrode over the semiconductor film is smaller than a spacing between an upper surface of the aluminum film of the drain electrode and an upper surface of the aluminum film of the source electrode over the semiconductor film.

11. A liquid crystal display device according to claim 10,
wherein the high melting point metal film comprises Mo,
Ti, Ta, W, or a silicide of one of them.
12. A liquid crystal display device according to claim 10,
wherein the pixel electrode contacts the high melting
point metal film.
13. A liquid crystal display device according to claim 10,
wherein the pixel electrode contacts the aluminum film.
14. A display device comprising:
a substrate;
an insulating film formed over the substrate;
an image signal line;
a pixel electrode; and
a thin film transistor comprising a gate electrode formed
between the substrate and the insulating film, a semiconductor
film formed over the insulating film, a drain electrode
electrically connected to the image signal line, and a source
electrode electrically connected to the pixel electrode,
wherein the drain electrode and the source electrode
comprise an aluminum film, and the drain and source electrodes
are disposed such that a spacing between a lower surface of the
drain electrode and a lower surface of the source electrode
over the semiconductor film is smaller than a spacing between

an upper surface of the drain electrode and an upper surface of the source electrode over the semiconductor film, and

wherein the gate electrode comprises an aluminum film, the aluminum film being dimensioned to cover a plan view area of a principal surface of the substrate larger than an area covered by the semiconductor film.

15. A display device comprising:

a substrate;

an insulating film formed over the substrate;

an image signal line;

a pixel electrode; and

a thin film transistor comprising a gate electrode formed between the substrate and the insulating film, a semiconductor film formed over the insulating film, a drain electrode electrically connected to the image signal line, and a source electrode electrically connected to the pixel electrode,

wherein the drain electrode and the source electrode comprise a high melting point metal film and an aluminum film formed over the high melting point metal film, and

wherein the gate electrode comprises an aluminum film, the aluminum film being dimensioned to cover a plan view area of a principal surface of the substrate larger than an area covered by the semiconductor film.

16. A liquid crystal display device according to claim 15,
wherein the high melting point metal film comprises Mo,
Ti, Ta, W, or silicide of one of them.

17. A liquid crystal display device according to claim 15,
wherein the pixel electrode contacts the high melting
point metal film.

18. A liquid crystal display device according to claim 15,
wherein the pixel electrode contacts the aluminum film.

19. A display device comprising:

a substrate;

an insulating film formed over the substrate;

an image signal line;

a pixel electrode; and

a thin film transistor comprising a gate electrode formed
between the substrate and the insulating film, a semiconductor
film formed over the insulating film, a drain electrode
electrically connected to the image signal line, and a source
electrode electrically connected to the pixel electrode,

wherein the drain electrode and the source electrode
comprise a high melting point metal film and an aluminum film
formed over the high melting point metal film, and the high
melting point metal film and the aluminum film of both the
source and drain electrodes are disposed such that a spacing

between a lower surface of the high melting point metal film of the drain electrode and a lower surface of the high melting point metal film of the source electrode over the semiconductor film is smaller than a spacing between an upper surface of the aluminum film of the drain electrode and an upper surface of the aluminum film of the source electrode over the semiconductor film, and

wherein the gate electrode comprises an aluminum film, the aluminum film being dimensioned to cover a plan view area of a principal surface of the substrate larger than an area covered by the semiconductor film.

20. A display device comprising:

a substrate;

a scanning signal line;

an insulating film formed over the substrate;

an image signal line;

a pixel electrode; and

a thin film transistor comprising a gate electrode connected to the scanning signal line and formed between the substrate and the insulating film, a semiconductor film formed over the insulating film, a drain electrode electrically connected to the image signal line, and a source electrode electrically connected to the pixel electrode,

wherein the drain electrode and the source electrode comprise an aluminum film, and the drain and source electrodes

are disposed such that a spacing between a lower surface of the drain electrode and a lower surface of the source electrode over the semiconductor film is smaller than a spacing between an upper surface of the drain electrode and an upper surface of the source electrode over the semiconductor film, and

wherein the gate electrode and the scanning signal line comprise an aluminum film, and the scanning signal line has an upper surface with a width that is smaller than a width of a lower surface of the scanning signal line.

21. A display device comprising:

a substrate;

an insulating film formed over the substrate;

an image signal line;

a pixel electrode; and

a thin film transistor comprising a gate electrode connected to the scanning signal line and formed between the substrate and the insulating film, a semiconductor film formed over the insulating film, a drain electrode electrically connected to the image signal line, and a source electrode electrically connected to the pixel electrode,

wherein the drain electrode and the source electrode comprise a high melting point metal film and an aluminum film formed over the high melting point metal film, and

wherein the gate electrode and the scanning signal line comprise an aluminum film, and the scanning signal line has an

upper surface with a width that is smaller than a width of a lower surface of the scanning signal line.

22. A display device comprising:

a substrate;

an insulating film formed over the substrate;

an image signal line;

a pixel electrode; and

a thin film transistor comprising a gate electrode connected to the scanning signal line and formed between the substrate and the insulating film, a semiconductor film formed over the insulating film, a drain electrode electrically connected to the image signal line, and a source electrode electrically connected to the pixel electrode,

wherein the drain electrode and the source electrode comprise a high melting point metal film and an aluminum film formed over the high melting point metal film, and the high melting point metal film and the aluminum film of both the source and drain electrodes are disposed such that a spacing between a lower surface of the high melting point metal film of the drain electrode and a lower surface of the high melting point metal film of the source electrode over the semiconductor film is smaller than a spacing between an upper surface of the aluminum film of the drain electrode and an upper surface of the aluminum film of the source electrode over the semiconductor film, and

wherein the gate electrode and the scanning signal line comprise an aluminum film, and the scanning signal line having an upper surface with a width that is smaller than a width of a lower surface of the scanning signal line.

2025-04-24 14:24:24